Remarks:

The above amendment and these remarks are responsive to the Office action dated October 6, 2005. Claims 1-41 are pending in the application. Claim 32 has been amended to delete the first occurrence of "a" in line 3 for grammatical consistency. Independent claims 1, 20 and 38-41 are amended to clarify that the surface on which the images are projected is a display surface disposed for viewing by one or more people and that the calibration image reflected from the display surface is compared to the intended calibration image. Additional amendments to these claims as well as claims 11, 23-26, 29, 31, 32 and 34 are made for consistency in terminology between the claims.

In the Office action, claims 1-41 were rejected as being anticipated by Smith (6,285,349). In view of the amendment above, and the remarks below, applicant respectfully requests reconsideration of the application under 37 C.F.R. § 1.111 and allowance of the pending claims.

Rejections under 35 USC § 102

For at least the reasons discussed below, applicant submits that Smith does not disclose the inventions described in independent claims 1, 20, 38, 39, 40 and 41, and the claims that depend from these claims.

Claim 1 is directed to a method of projecting an image with display-condition compensation, the method, comprising projecting a principal image onto a principal area of a display surface disposed for viewing by one or more people; projecting an intended calibration image onto a calibration area of the display surface when the principal image is not projected onto the calibration area; receiving a reflection from the display surface of the projected calibration image; comparing the received

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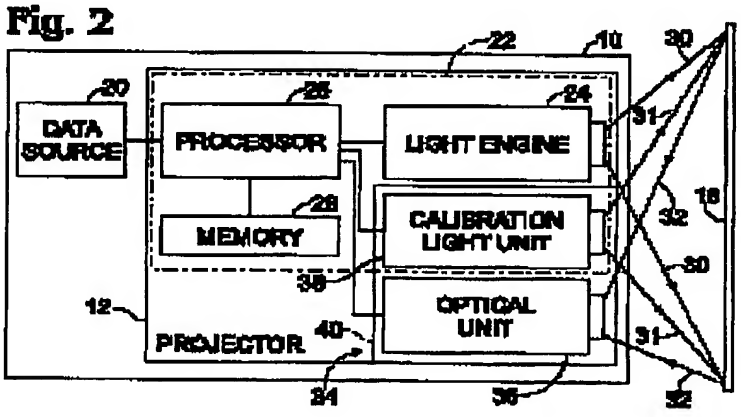
calibration image to the intended calibration image to determine an observed difference; and modifying projection of the principal image based on the observed difference.

Figure 2 of the application, reproduced below, illustrates an exemplary display system 10 configured to perform the steps provided in claim 1.

Fig. 2



Display system 10 may include a projector 12 that may further include a light engine apparatus 22. Light engine apparatus 22 may have various configurations, and is typically configured to direct and transmit light to display surface 18 so as to generate a projected image, such as an image of a spatial light modulator. The projected image may be derived from, and therefore generally correspond to, image data received from a computer 20. Light engine apparatus 22 may include one or more light engines 24. Light engine 24 may include any suitable illumination source adapted to address optically a display surface 18. A processor 26 may be configured to receive image data from image data source 20 and to convert the image data into commands appropriate for driving light engine 24. Processor 26 may be in communication with a memory 28 that serves as temporary (or long term)

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storage of data such as image data, calibration information, color information, and other data needed by processor 26 to operate projector 12.

In response to commands from the processor, light engine 24 may transmit and direct visible light in the form of a projected principal image 30 to display surface 18 to produce displayed image 32.

In order to compensate for the color characteristics of the display surface, display system 10 may include a feedback or calibration system 34 that permits the output of light engine 24 to be modified in order to at least partially compensate for the color characteristics of the display surface and other display conditions. The calibration system may be generally configured to compare a reflection of the image displayed on the display surface to the intended image in order to identify detectable differences between the displayed image and the desired image. The intended image may correspond to an image provided by intended image data and associated operating parameters of the light engine, such as use of filters, light source modulation, spatial light modulators, and other electro-optical characteristics of the light engine. Once the detectable differences have been identified, the projected image may be modified in order to at least partially compensate for the identified detectable differences.

The calibration system may be incorporated in projector 12, as shown in Fig. 2. The calibration system may include an optical unit 36 that is configured to detect the optical characteristics of the displayed calibration image. Optical unit 36 may include a sensor, where the sensor may be configured to detect the color characteristics of the reflection of the displayed image. The calibration system may include a separate light engine, referred to as a calibration light unit 38. Light unit 38

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may be limited to producing calibration images, such as white, red, green and blue lights of known or intended color characteristics, multicolor images providing color test patterns, or more complex images. The calibration light unit and the optical unit may be considered a calibration unit 40 included in calibration system 34.

The calibration image may be produced by calibration light unit 38, and projected separately from the principal image, as shown generally at 31. The optical unit may be positioned to view the image displayed on the screen. Once the optical unit has detected and/or recorded the characteristics of the displayed calibration image, the display system may compare the displayed calibration image to the intended calibration image.

Smith, on the other hand, samples a projected image as it is transmitted from a light engine and prior to the image being displayed on a display surface. The purpose of the invention disclosed by Smith is to calibrate for non-uniformities in the display unit 12. (Column 3, lines 18-26). An external display screen 40 is positioned some distance away from the projection display unit 12. (Column 2, lines 36-38). This is achieved by diverting light output by the display unit and prior to its display on the display surface. Figure 1B of Smith illustrates this process. It does not matter if the light reflected at the display is accurate, but only that the field of illumination that is transmitted toward the display surface is calibrated to be uniform. (Column 5, lines 26-30). In fact, the calibration may be performed at the display factory, totally independent of a display surface that is used. (Column 9, lines 6-12).

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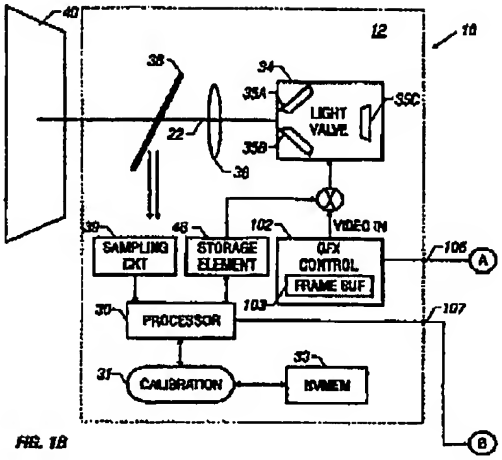

FIG. 1B

It is seen that light entering sampling circuit 39 is received from a sampling glass 38 contained in the display unit. The sampling glass extracts a small portion of the light output from the light valve 34. (Column 5, lines 60 - Column 6, line 2). The display system of Smith is thus not able to compensate for the effect of the display surface or ambient conditions on the displayed image.

It is therefore clear that Smith does not provide for at least receiving a reflection of the calibration image displayed on the display surface; comparing the received calibration image to the intended calibration image to determine an observed difference; and modifying projection of the principal image based on the observed difference. A finding of anticipation requires that all of the claimed elements be provided in the cited reference. That not being the case with Smith, withdrawal of the rejection of claim 1 is requested.

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Claims 2-19, which depend from claim 1, are also patentable for at least the reasons that claim 1 is patentable over Smith as discussed above.

Claim 20 is directed to a display device comprising a light engine apparatus configured to project a principal image and an intended calibration image onto a display surface disposed for viewing by one or more people, where at least a portion of the intended calibration image has an intended first color characteristic; an optical unit configured to receive a reflection from the display surface of the projected calibration image; and a processor configured to direct projection of the intended calibration image onto a calibration area of the display surface when the principal image is not projected onto the calibration area; compare the received calibration image to the intended calibration image to determine an observed difference; and modify projection of the principal image based on the observed difference.

As discussed above, Smith does not disclose a display device having these features. Accordingly, withdrawal of the rejection based on Smith is appropriate for claim 20, as well as claims 21-38, which depend from claim 20.

For similar reasons, applicant submits that claim 38 is directed to a calibration unit, claim 39 directed to a display device, claim 40 directed to a storage medium, and claim 41 directed to an electronic device are patentably distinguishable over Smith.

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Applicants believe that this application is now in condition for allowance, in view of the above amendments and remarks. Accordingly, applicant respectfully requests that the Examiner issue a Notice of Allowability covering the pending claims. If the Examiner has any questions, or if a telephone interview would in any way advance prosecution of the application, please contact the undersigned attorney of record.

Respectfully submitted,

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CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that this correspondence is being facsimile transmitted to Examiner A. Brautigam, Group Art Unit 2676, Assistant Commissioner for Patents, at facsimile number (571) 273-8300 on January 6, 2006.

Christie A. Doolittle

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